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10	US 5856244 A
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12	US 5707905 A

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13	US 5585166 A
14	US 5585166 A
15	EP 669482 A

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TITLE: Multilayer friction surface for torque transfer
devices e.g. brakes -
has layers of different porosity, one contg. cellulosic and
other fibres and
the other duroplast-bonded fibres

INVENTOR: KEARSEY, A

PATENT-ASSIGNEE: HOERBIGER & CO[HOERN], HOERBIGER
ANTRIEBSTECHNIK
GMBH[HOERN], HOERBIGER BETEILIGUNGS GMBHMBH[HOERN]

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DE 59506496 G	September 9, 1999	N/A
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ABSTRACTED-PUB-NO: EP 669482A

BASIC-ABSTRACT: The novel features in a multilayer friction surface for use in torque transfer devices such as friction coupler, synchronisation elements or brakes cooled by a fluid or a lubricant are that (i) the porous sublayer (11, 11') attached to carrier (2) and consisting of cellulose together with synthetic fibres and fillers has a wt. of 200-1500 g/m²; and (ii) the upper layer (12) which is of duroplast-bonded fibres (e.g of B, C, fibrillated aramid, glass, minerals or ceramics, esp C) has a higher porosity than layer (11, 11').

Pref. layer (12) has a wt. of 10-120 g/m² a thickness of

0.02-0.3 mm and a porosity of 50-95% while sublayer (11) has a thickness of 0.3-2.5 mm and a porosity of only 10-50% (10-20% for synchronisation rings and 40-50% for friction laminates). Sublayer (11) has a duroplast fraction of 20-60 wt.% of its total wt. this duroplast being a phenolic modified resin (resol or novolak), epoxy resin, melamine, silicone resin or acrylic resin, esp. 28-36 wt.% phenolic resol. The filler in layer (11) is absorbent (more than 2.5 times its own wt. of oil) and is esp. a crystalline silicate forming 2-10 (esp. ca.10) wt.% of the layer.

ADVANTAGE - The heat resistance and low static-dynamic friction ratio advantages of the fibres are combined with the low cost, reliability and low wear of sinter metal layers.

ABSTRACTED-PUB-NO: EP 669482B

EQUIVALENT-ABSTRACTS: The novel features in a multilayer friction surface for use in torque transfer devices such as friction coupler, synchronisation elements or brakes cooled by a fluid or a lubricant are that (i) the porous sublayer (11, 11') attached to carrier (2) and consisting of cellulose together with synthetic fibres and fillers has a wt. of 200-1500 g/m²; and (ii) the upper layer (12) which is of duroplast-bonded fibres (e.g. of B, C, fibrillated aramid, glass, minerals or ceramics, esp. C) has a higher porosity than layer (11, 11').

Pref. layer (12) has a wt. of 10-120 g/m² a thickness of 0.02-0.3 mm and a porosity of 50-95% while sublayer (11) has a thickness of 0.3-2.5 mm and a porosity of only 10-50% (10-20% for synchronisation rings and 40-50% for friction laminates). Sublayer (11) has a duroplast fraction of 20-60 wt.% of

its total wt. this duroplast being a phenolic modified resin (resol or novolak), epoxy resin, melamine, silicone resin or acrylic resin, esp. 28-36 wt.% phenolic resol. The filler in layer (11) is absorbent (more than 2.5 times its own wt. of oil) and is esp. a crystalline silicate forming 2-10 (esp. ca.10) wt.% of the layer.

ADVANTAGE - The heat resistance and low static-dynamic friction ratio advantages of the fibres are combined with the low cost, reliability and low wear of sinter metal layers.

US 5585166A

A fluid-cooled friction lining for attachment to a carrier body in a torque-transferring device, the friction lining including a friction surface facing away from the carrier body, the friction lining comprising a porous substrate layer which can be bonded to the carrier body and which includes a mixture of cellulose and synthetic fibers, filler and a thermoset resin, and a porous friction layer which provides said friction surface and which includes a mixture of non-woven synthetic fibers in a thermoset resin, said substrate layer having a weight from 200 to 1500 g/m² and said friction layer having a higher porosity than said substrate layer.

CHOSEN-DRAWING: Dwg.3,6/6 Dwg.3/6

TITLE-TERMS:

MULTILAYER FRICTION SURFACE TORQUE TRANSFER DEVICE BRAKE
LAYER POROUS ONE
CONTAIN CELLULOSIC FIBRE DUROPLAST BOND FIBRE

DERWENT-CLASS: A21 A88 P73 Q63

CPI-CODES: A03-A01; A08-R01; A12-H10; A12-S08D1;

ENHANCED-POLYMER-INDEXING:

Polymer Index [1.1]
 017 ; H0011*R ; P0226 P0282*R D01 D18 F30 ; L9999 L2391 ;
 L9999
 L2073 ; M9999 M2073
 Polymer Index [1.2]
 017 ; P0464*R D01 D22 D42 F47 ; L9999 L2391 ; L9999 L2073
 ; M9999
 M2073
 Polymer Index [1.3]
 017 ; R00859 G1809 G1649 D01 D23 D22 D31 D45 D50 D83 F19
 F10 F07
 ; H0011*R ; P0259*R P0226 D01 ; L9999 L2391 ; L9999 L2073
 ; M9999
 M2073
 Polymer Index [1.4]
 017 ; P1445*R F81 Si 4A ; L9999 L2391 ; L9999 L2073 ;
 M9999 M2073
 Polymer Index [1.5]
 017 ; P0088*R ; L9999 L2391 ; L9999 L2073 ; M9999 M2073
 Polymer Index [1.6]
 017 ; ND01 ; K9892 ; K9574 K9483 ; K9701 K9676 ; Q9999
 Q7603*R ;
 Q9999 Q7614 Q7603 ; B9999 B5243*R B4740 ; K9449 ; K9712
 K9676 ;
 K9698 K9676 ; K9483*R ; B9999 B5221 B4740 ; B9999 B4842
 B4831 B4740
 ; B9999 B4682 B4568 ; B9999 B5367 B5276 ; B9999 B5287
 B5276 ; B9999
 B5447 B5414 B5403 B5276
 Polymer Index [1.7]
 017 ; G2891 D00 Si 4A ; R01668 D00 D09 B* 3A ; R05086 D00
 D09 C*
 4A ; A999 A419 ; S9999 S1070*R ; S9999 S1183 S1161 S1070
 ; A999
 A771 ; B9999 B5254 B5243 B4740 ; S9999 S1092 S1070
 Polymer Index [1.8]
 017 ; D00 O* 6A Si 4A ; A999 A237 ; B9999 B3383*R B3372 ;
 B9999
 B4795 B4773 B4740
 Polymer Index [1.9]
 017 ; R01669 D00 D09 C* 4A ; A999 A237 ; S9999 S1456*R
 Polymer Index [2.1]
 017 ; R01852*R G3634 D01 D03 D11 D10 D23 D22 D31 D42 D50
 D86 F24
 F29 F26 F34 H0293 P0599 G3623 ; S9999 S1183 S1161 S1070 ;
 A999 A419
 ; A999 A782 ; S9999 S1092 S1070
 Polymer Index [2.2]

017 ; P0737*R P0635 H0293 F70 D01 D18 ; S9999 S1230 S1229
 S1070
 ; S9999 S1183 S1161 S1070 ; A999 A419 ; A999 A782 ; S9999
 S1092
 S1070
 Polymer Index [2.3]
 017 ; B9999 B5254 B5243 B4740
 Polymer Index [3.1]
 017 ; H0011*R ; P0226 P0282*R D01 D18 F30
 Polymer Index [3.2]
 017 ; R00817 G0475 G0260 G0022 D01 D12 D10 D51 D53 D58
 D83 F12 ;
 R00806 G0828 G0817 D01 D02 D12 D10 D51 D54 D56 D58 D84 ;
 H0022 H0011
 ; H0124*R ; P0328 ; P0088 ; P0124 ; P0135
 Polymer Index [3.3]
 017 ; ND01 ; K9892 ; K9574 K9483 ; K9701 K9676 ; Q9999
 Q7603*R ;
 Q9999 Q7614 Q7603 ; B9999 B5243*R B4740 ; Q9999 Q6644*R ;
 K9745*R
 Polymer Index [4.1]
 017 ; P0464*R D01 D22 D42 F47
 Polymer Index [4.2]
 017 ; P0088*R
 Polymer Index [4.3]
 017 ; ND01 ; K9892 ; K9574 K9483 ; K9701 K9676 ; Q9999
 Q7603*R ;
 Q9999 Q7614 Q7603 ; B9999 B5243*R B4740 ; Q9999 Q6644*R

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3	US 6194059 B1
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5	US 6001750 A
6	US 5998307 A
7	US 5958608 A
8	US 5958507 A